

1

## BACKLIGHT IMAGE SENSOR CHIP HAVING IMPROVED CHIP DRIVING PERFORMANCE

This application is a national stage application of PCT/ KR2014/007504 filed on Aug. 12, 2014, which claims priority of Korean patent application number 10-2013-0096910 filed on Aug. 14, 2013. The disclosure of each of the foregoing applications is incorporated herein by reference in its entirety.

### TECHNICAL FIELD

The present invention relates to an image sensor technique, and more specifically, to a backlight image sensor chip having an improved chip driving performance.

### BACKGROUND ART

In Korean Patent Publication No. 10-2011-0096275, published on Aug. 30, 2011, which is applied by applicant of the present invention, a method for forming a pad of a wafer having three dimensional structure, which is implemented through a simple manner without a damage of a silicon substrate surface and a super contact, by forming an insulation layer without performing a process for etching a separate silicon substrate after a back side thinning process of an element wafer, forming a via on a back side of the super contact, and forming a pad on a back side of the via, was proposed.

In case of a backlight image sensor chip acquired from a wafer, which is manufactured by using a method for forming a pad of a wafer having a conventional three dimensional structure, a region between a pad region in which a pad is formed and a sensing region in which an optical filter is formed is not used.

Thus, inventors of the present invention have developed a technique for improving a chip driving performance of a backlight image sensor chip having a restricted area without an additional process by using a region that excludes the pad region in which the pad of the backlight image sensor chip is formed and the sensing region in which the optical filter is formed, as an auxiliary driving region.

### DISCLOSURE

#### Technical Problem

The present invention is directed to a backlight image sensor chip for improving a chip driving performance of a backlight image sensor chip having a restricted area without an additional process by using a region, which excludes a pad region in which a conductive pad of a backlight image sensor chip is formed and the sensing region in which the optical filter is formed, as an auxiliary driving region.

#### Technical Solution

In accordance with an embodiment of the present invention, a semiconductor device

#### Advantageous Effects

The present invention may improve a chip driving performance since an additional function such as an auxiliary power supply, an auxiliary signal transmission and an auxiliary operation control in a backlight image sensor chip

2

having a restricted area without an additional process is performed by using a region, which excludes a pad region in which a conductive pad of a backlight image sensor chip is formed and the sensing region in which the optical filter is formed, as an auxiliary driving region.

### DESCRIPTION OF DRAWINGS

FIG. 1 is a cross sectional view illustrating a backlight image sensor chip having an improved chip driving performance in accordance with a first embodiment of the present invention.

FIG. 2 is a cross sectional view illustrating a backlight image sensor chip having an improved chip driving performance in accordance with a second embodiment of the present invention.

FIG. 3 is a cross sectional view illustrating a backlight image sensor chip having an improved chip driving performance in accordance with a third embodiment of the present invention.

FIG. 4 is a flow chart illustrating a manufacturing process of a backlight image sensor chip having an improved chip driving performance in accordance with an embodiment of the present invention.

### BEST MODE

Hereinafter, various embodiments will be described below in more detail with reference to the accompanying drawings such that a skilled person in this art understand and implement the present invention easily.

In the descriptions of the present invention, the detailed descriptions will be omitted in case that the detailed descriptions related to the published configurations or functions blur the gist of embodiments of the present invention unnecessarily.

Since specific terms used in this specification of the present invention are terms, which are defined according to the functions of the embodiments of the present invention, and may be changed fully according to the purpose or custom of a user or an operator, the definition of the terms is determined based on the contexts considered in the specification of the present invention.

FIG. 1 is a cross sectional view illustrating a backlight image sensor chip having an improved chip driving performance in accordance with a first embodiment of the present invention, and FIG. 2 is a cross sectional view illustrating a backlight image sensor chip having an improved chip driving performance in accordance with a second embodiment of the present invention.

As shown in FIGS. 1 and 2, a backlight image sensor chip having an improved chip driving performance in accordance with embodiments of the present invention includes a semiconductor substrate **100**, an element stacked unit **200**, an insulation multi-layer **300**, a conductive pad **400**, a coupling unit **500**, at least one routing metal **600**, at least one auxiliary driving unit **700** and an auxiliary coupling unit **800**.

The semiconductor substrate **100** may be a silicon substrate having a thickness of 2-6  $\mu\text{m}$  and be formed by a back side thinning process of the element stacked unit **200**, which is formed on a front side.

The element stacked unit **200** is formed on a front side of the semiconductor substrate **100**, and includes a semiconductor circuit module **210** including a peripheral circuit **211** and a metal distribution line **212**, an image sensor module including a photodiode **221** and a metal distribution line **222**, and an interlayer insulation layer **230** for an electrical